

requires appraising which federal purchases are similar to such private investment. Federal expenditures for the construction of federally owned dams or other such structures belong to this group. But other federal expenditures may be considered investment by a broader definition. Just as investment in physical assets adds to the nation's tangible capital, spending on research, education, or other activities is sometimes regarded as contributing to its intangible intellectual and human capital. Further, governments have broader aims than private investors; they construct facilities to provide benefits other than income, such as the benefits of national security resulting from expenditures on defense. Finally, federal subsidies encourage other governments and private actors to make investments of their own. All of these activities might be considered federal investment under varying definitions or concepts. Thus, answering "what is investment?" and correspondingly "what is its federal component?" requires examining a wider range of investment concepts.

The third question calls for consistent and reliable measures of value. The values assigned to federal investment should reflect the services it provides; an additional dollar's worth of federal investment should provide the same value of services as a comparable marginal dollar of private investment if it is to be measured correctly. But there are no markets to establish prices for many government assets, and available data reflect only construction or acquisition costs. A cost-based measure of value is valid only if it reflects rates of return on federal investments that are comparable with those earned by private investments, so that, dollar for dollar, public and private investments may be considered equal contributions to wealth. Additional measurement issues concern the same questions of depreciation, obsolescence, and useful life that are relevant when valuing private investments.

This study approaches these issues using the framework of the National Income and Product Accounts as a starting point. This framework counts as investment those private purchases of durable structures and equipment that contribute to the production of future national output. By and large, this conforms with the conventional view of investment as purchases of business plant and equipment. A different definition is used by the Office of Management and Budget (OMB) in its Special Analysis D (which compiles federal outlays that

"yield long-term benefits"). Special Analysis D includes all federal outlays that produce lasting benefits of any kind. Thus, OMB includes outlays that range from the construction of physical assets to student loans to the conduct of the census. Moreover, until the 1985 budget, the OMB series set forth only gross investment and not the net investment measures that show the extent to which real additions to wealth have occurred.

NIPA data do not now include federal investment, and estimates of it therefore require extending the NIPA framework to government spending. The NIPA framework is thus first used to identify federal investment that can be compared directly with official data on private investment, and then to examine possible extensions of the concept of investment to cover investment in defense assets, scientific or intangible capital, federal investment subsidies, and human capital.

## CHAPTER II

### DEFINING PUBLIC INVESTMENT

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Identifying trends in federal investment requires distinguishing those federal activities that qualify as investment. Private investment is identified and measured in the National Income and Product Accounts of the United States. This chapter describes the NIPA view of investment and applies it to federal activities. It then examines possible extensions of the NIPA view that would allow broader definitions of federal investment.

#### THE NIPA CONCEPT OF INVESTMENT

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The NIPA do not provide a formal, specific definition of those economic activities that are considered investment. Rather, a definition of investment must be inferred from the many decisions the NIPA make as to those activities that are and are not included in this category. The NIPA generally regard as investment the purchases of durable goods (such as equipment or structures) that are used by businesses to create future output and, in turn, income. This implied definition has two important implications. First, the goods characterized as investment are tangible, as implied by the emphasis on durables. Second, investment leads to future output and, therefore, is an activity found in the business sector, since it is only the business sector that, in the view of the NIPA, creates economic output and income. (The income earned by providing government services, for example, is attributed to the taxes paid or the dissaving incurred to pay for government spending.) While no formal definition of investment is provided by the NIPA, these two principles consistently appear in the calculation of investment.

The sole exception to this rule concerns purchases of owner-occupied housing, which are considered investment. This exception is made because home ownership provides households with an imputed



stream of income equal to the rent that they need not pay. Even though the income is not taken as cash, it nonetheless exists--households, in this view, are like businesses that rent their houses to themselves. While it can be argued that other purchases of durable goods--automobiles, for example--also provide income streams, home ownership is the sole exception allowed in the NIPA.

According to this view, governments do not invest. In compiling NIPA estimates of national economic aggregates, almost all government expenditures are considered current expenses, or a form of public consumption. Thus, under the NIPA, the public sector's budget deficit is a form of dissaving and affects national investment to the extent that dissaving reduces the resources available for investment.<sup>1/</sup>

Government purchases of fixed facilities similar to business plant and equipment are not counted as investment in the NIPA, in part because they are not managed the way a private enterprise might manage them. The NIPA effectively treat all government activities--even those that resemble private investment--as if they generate no new income in the future. In practice, it is often difficult to separate the extent to which publicly owned facilities will generate future income (as do firms) from the extent to which those facilities represent future subsidies to their users provided by taxpayers. Yet despite this distributional issue, the outputs of these activities often strongly resemble the outputs of private investment.

### Applying the NIPA Standard to the Public Sector

The NIPA accounting view clearly fails to reflect the investmentlike effects of government activities. If the standard of durable goods that produce future output and income were applied to governments, some

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1. Under the NIPA rules, government outlays for net land purchases and new loan disbursements are thus included in government saving measures offset, in national totals, by private dissaving through land sales and loan liabilities. Other coverage differences between the NIPA and the unified budget are that the NIPA measure includes all on- and off-budget agencies, but excludes social insurance receipts and payments to residents of U.S. territories and Puerto Rico. The NIPA measure also makes other adjustments for accruing revenues and expenses so that measures of government budgets are consistent with income measures for other sectors.

of their activities could well be considered investment. States and localities, for example, own and operate utility companies that provide water, electricity, gas, and transit services as do private firms. The federal government has a worldwide network of defense installations that includes such facilities as hangars and docks. It also operates a national system for air traffic control and a national space agency, both of which provide commercial services. All levels of government own substantial property--vehicles, computers, and offices--used in conducting their affairs. In fact, at the agency level, government accounting practices separate investment from consumption transactions, and many agencies present balance sheets showing proposed changes in assets along with budget spending requests. 2/

If the NIPA distinction between capital and current purchases by households and businesses were also used to differentiate investment from other spending in federal budgets, then purchases of structures and equipment used by federal enterprises and other entities to produce future income would qualify as investment. According to this view, these expenditures have provided the nation with a capital stock that has helped to produce either goods bought and sold in commercial activities or public services. Included would be the construction of fixed facilities by federal power authorities and other federal enterprises, by the Postal Service, and by the agencies that manage water and energy resources (since, even when not operated commercially, these provide commercial inputs to agriculture and townships). Also included would be the construction of public facilities, like roads, that generate future economic benefits.

New tangible assets--like federal buildings or computers--would also be included as government investment. While not used directly in businesslike activity, these items provide a measurable output that affects the cost of providing federal services. For example, the purchase of a federal computer obviates the need to rent the services of such a machine from private firms, just as owner-occupied housing obviates paying rents. Yet, in the absence of government purchases, private firms could have purchased a computer and subsequently rented it for a profit to the government; this would have allowed its

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2. See, for example, National Aeronautics and Space Administration, *Budget Estimates Fiscal Year 1988*, vol. 2, Construction of Facilities.

inclusion as investment in the NIPA. Thus, these federal purchases could be defined as investments.

The Bureau of Economic Analysis compiles data on national wealth that include measures of fixed assets and equipment in the public capital stock.<sup>3/</sup> This data series is used in this paper. It is supplementary to the main national income accounts and is derived from NIPA data on government purchases of structures and durable equipment, but these purchases are not counted as investment in NIPA measures of national investment.

Recognizing government investment in national accounting would change measures of national capital formation. Government investment--and national saving, since government purchases would no longer be treated as consumption--would be increased (and deficits reduced) by the amount of annual spending defined as investment. Treating federal investment in a fashion parallel to business investment would also require calculating the yearly deduction for capital consumption, or depreciation, on the public capital stock and adding it to current expenditures, paralleling firms' accounting for the costs of capital services from their plant and equipment in producing their outputs. Federal government dissaving would then be equal to the deficit minus the net change in the value of the federal capital stock.

## EXTENDED CONCEPTS OF CAPITAL

Many researchers have found the NIPA concept of investment restrictive and have compiled alternative series for national investment. Most of these analysts adhere to the NIPA principle that the defining characteristics of capital are that it is long-lived and creates benefits in the future, but they also extend the range of activities that are considered investment.

Some argue that governments often do not have businesslike objectives and that their investment should be measured relative to

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3. See Department of Commerce, Bureau of Economic Analysis, *Fixed Reproducible Tangible Wealth in the United States, 1925-1985* (July 1987).

what they do, rather than to what produces "income." For example, the federal government provides goods or services that produce "welfare" or "well-being," though not measurable income. Among these are the preservation of pristine natural areas; continuity of the culture through the arts; law and justice; and defense activities. Of these, the most important source of investmentlike activity is in the untraded (non-NIPA) stock of defense assets.

Others note that the concept of long-lived assets that create future income could be applied to various types of intangible or intellectual capital. In fact, these types of assets are useful in explaining changes in productivity, suggesting that "intangible" capital--the store of knowledge from findings of research activity--plays a role like that of physical capital in the production process. Certainly, research and development (R&D) produces innovations in products or production processes that generate profits and higher future income.

In other cases, federal activities subsidize investments that occur in other sectors. For example, federal funds pay for a portion of the nation's highway system, even though the resulting roads are owned and maintained by the states. Nonetheless, these investment subsidies might be treated as the federal share of an investment originating in its sphere.

Many researchers studying economic growth have used the concept of "human capital"--the store of skill and other labor services in people--since it was developed in detail in the early 1960s.<sup>4/</sup> This concept extends the idea of capital to include the skills and abilities brought to production by labor. Just as equity holders own the plant and equipment that produce goods and services (and, in turn, profits), workers have reserves of knowledge, skill, and experience with which they earn their incomes. Capitalizing such reserves gives a measure of human capital.

There is no agreement among economists that any or all of these expansions of the NIPA definition of investment are warranted, although a case can be made for each. Nonetheless, applying these

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4. See Gary S. Becker, *Human Capital* (New York: National Bureau of Economic Research, 1964).

concepts would lead to four possible extensions of measures of federal investment, all of which reflect the principles underlying the NIPA definition of investment while extending the actual measurements beyond those consistent with NIPA data for private investment. In most cases, to maintain consistency, equivalent extensions would have to be made for measuring investment in private sectors--just as extending the NIPA concept for federal accounts would require equal treatment for state and local budgets.

The four extensions of the NIPA definition of investment considered in this report are explained below.

Investment Providing for National Defense. The federal government buys long-lived weapons systems that, although they do not produce measurable future income, provide deterrence services over several years. An expanded federal investment series could, therefore, treat such purchases as investment, with their return being the unmeasurable benefits of deterrence.

Investment in Intangible Capital. Nearly half of the national research and development activity is now performed in or under contract to federal agencies. This contributes to scientific or intangible capital that assists in generating commercial innovations.

Investment through Federal Capital Subsidies. Federal spending accounts for half of all national spending on public facilities and infrastructure, most of it through grants to state and local governments. Subsidized federal loan programs also help to finance private as well as public capital projects. Extending capital concepts to include investment subsidies would need conventions to avoid double counting: private investment data already include many subsidized components, and federally financed state or local investments would have to be attributed to a single sector or split.

Investment in Human Capital. Like investment through grants, human capital investment is made not by federal agencies but by subsidy recipients. Thus, if human capital were included in the NIPA, most adjustments would be made to household spending. Nevertheless, federal financing for human capital could be considered a federal contribution to investment.



Table 2 shows federal expenditures that could be reclassified as investment under the view of business and household investment currently used in national accounts estimates, as well as those under each of the four extended views. (The latter would also require some changes in national estimates of investment in other sectors.)

Regardless of whether these extensions of the NIPA definition are considered acceptable, the fact that new long-lived federal physical assets that create future output and income are not considered "investment" suggests that NIPA practices now understate national capital formation. This leads to the question of whether including public investment would substantially change the picture of national investment. Part of that answer rests on how reliably federal investment can be measured and its subsequent depreciation estimated.

TABLE 2. FEDERAL EXPENDITURES QUALIFYING AS INVESTMENT UNDER DIFFERENT CONCEPTS OF CAPITAL

	National Accounting Concepts		Extended Concepts
	Current National Income and Product Accounts (NIPA)	Business and Household Capital Concepts in NIPA Extended to the Federal Sector	Weapons and Weapons Carriers Used in National Defense Activity
Included as Investment	No federal expenditures are counted as investment in current national income and product accounts.	Federal purchases of fixed facilities and equipment used in producing national income would be included.	Federal purchases of major weapons systems, weapons carriers, and tactical vehicles could be included.
Examples		Investment would include federal expenditures for purchase or construction such as:  -office and other buildings -water resource development projects -military base facilities -federal housing -major equipment -assets of power marketing authorities -physical assets of research and development agencies	Investment would include purchases such as:  -aircraft -missiles -ships -armored vehicles -support equipment
Required Parallel Changes		State and local government purchases of fixed assets would also be reclassified as investment.	Expenditures for defense buildings and bases are included under NIPA investment concepts.

TABLE 2. (Continued)

Extended Concepts (Continued)		
Intangible Capital	Federal Subsidies for Capital Investment	Human Capital
Federal expenditures for research and development activity could be included.	Grants from the federal to state and local governments for constructing facilities or for purchasing major equipment could be included, along with credit subsidies for capital purposes.	Federal expenditures for human development could be included.
Investment would include federal expenditures for operating agencies and activities such as:	Investment would include federal outlays for capital grants to construct facilities such as:	Investment would include federal outlays and credit subsidies for activities such as:
<ul style="list-style-type: none"> <li>-defense R&amp;D programs</li> <li>-national laboratories (DOE)</li> <li>-National Institutes of Health</li> <li>-National Science Foundation</li> <li>-NASA R&amp;D</li> <li>-agricultural extension and research</li> <li>-transportation research</li> </ul>	<ul style="list-style-type: none"> <li>-federal-aid highways</li> <li>-community and urban development projects</li> <li>-mass transit</li> <li>-wastewater treatment plants</li> <li>-airports</li> <li>-schools and hospitals</li> </ul> <p>and credit subsidies for:</p> <ul style="list-style-type: none"> <li>-rural electrification</li> <li>-rural water supply</li> <li>-small business development</li> <li>-housing</li> </ul>	<ul style="list-style-type: none"> <li>-education grants to states</li> <li>-student assistance</li> <li>-job training</li> </ul>
Private research and development spending would also be reclassified as investment under this concept. Purchases of plant and major equipment used in research fall under the NIPA investment series.	To avoid double counting, state and local investment totals under the NIPA concept could be reduced by the amount of capital grants, or grant-financed investment, attributed directly to other governments.	Similar spending by households and businesses would be reclassified as investment.

SOURCE: Congressional Budget Office.



## CHAPTER III

# VALUING FEDERAL INVESTMENTS

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What are federal investments worth? Beyond the problems inherent in identifying federal programs that create capital lies the issue of assigning a value to that capital. Economists generally recognize several different approaches to valuing private capital traded in markets. Valuation becomes even more difficult in the special circumstances of federal investment.

This chapter discusses issues that arise in valuing federal investment, including:

- o The implication of using outlays for fixed facilities as a measure of the value of investment;
- o How investment subsidies (from both taxes and credit programs) affect the value of investments; and
- o What rules for depreciation are appropriate for the public capital stock.

The value of investments is a measurement issue insofar as the NIPA use the cost of investments as a measure of their value; at issue is whether this practice is suitable for public-sector investments. An investment is worth the future stream of benefits it will provide. The value of these benefits depends on events yet to occur. An active capital market will establish values for all investments, based on what investors are willing to pay to secure ownership of the future benefit streams. Since investment adds to the stock of capital, the governing prices in these markets reflect how the addition of extra capital is valued. Investment will expand until the price buyers will pay for the benefits is equal to the costs of producing (or replacing) the assets that provide them (adding the noncash costs associated with management, decision-making, and risk-taking). Over the long term, active markets with flexible prices will tend to equilibrate the three

cash value measures--what buyers are willing to pay, what assets cost to produce, and what they would cost to replace. More speculative investment projects, with uncertain future streams of benefit payments, will have high noncash costs and will ordinarily sell for less than cash cost so as to cover their noncash costs and induce sales. As uncertainty declines, the market worth of the marginal investment and the cash cost of producing it tend to approach each other. Thus markets tend to brake private investment once the last project has been undertaken that will repay its construction cost in future benefits. Projects that cannot repay their costs will not generally be undertaken. Even though some investments are subsidized and others prove mistaken, the wealth created through private investment will tend to equal at least the construction or contract cost of the facilities.

The logic of public investment is different from that of private investment and, therefore, similar measures of the wealth created by federal investment are difficult to establish. Data on outlays for federal investments may over- or understate the value of these investments. Since government projects are motivated by both economic rates of return and social goals, government investment tends to expand beyond what strictly wealth-creating criteria would advise private investors to do, and thus federal construction may provide lower rates of return than private investment in terms of the future income it will generate. Moreover, federal spending on investmentlike activity often takes the form of subsidies for investment by others. Yet the investment resulting from federal subsidies should be credited to federal investment only if these subsidies actually stimulate new activities dollar-for-dollar.

Some federal investments--such as those that predicate regional development or scientific discovery--may have very large rates of return, but these returns may be so broadly dispersed throughout the economy that they are difficult to attribute and measure. Moreover, the value of some private investments may depend critically on the existence of federal investments, such as roads or ports. Thus, using expenditures (in the case of the federal government, outlays) to measure the value of both public and private investments reflects the assumption that the problems of the relative worth of these investments are largely self-canceling and that public investments are, in the aggregate, substitutable for private ones on a dollar-for-dollar basis.

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## MEASURING FEDERAL INVESTMENT OUTLAYS

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The investment value of federal construction and equipment purchases is difficult to measure. The dominance of the federal government in many relevant markets means that contract prices cannot be taken as a reliable measure of the value of federal transactions. Furthermore, low prices for the services produced by government facilities may result in inflating the demand for them, so that demand often cannot be used to estimate the benefits of the facilities as a check on investment values based on construction cost. But construction or contract price data are commonly the only measure of investment that is available.

Government intervention in economic activity is often to provide goods or services that are socially worthwhile but that entrepreneurs would not find profitable to produce or sell. Typically, such intervention may provide public goods that are available to all without restriction (such as national defense); or the intervention may be to correct or prevent adverse effects of other activities in the economy (as in pollution abatement programs); or it may pursue social goals (such as regional development). To be nationally worthwhile, fixed facilities constructed for these purposes need not be backed by an identifiable future income stream that recovers the cost of constructing them. In NIPA terms, the income they generate would then be less than their construction costs, even if the investments create social benefits or unattributable economic benefits.

This is the dilemma of the NIPA accountants and the reason they exclude government structures and equipment purchases from national investment totals. This study values federal investment as the construction cost for facilities (since this is the best information available), just as private investment is measured. But a true measure of the wealth created through federal investment would most likely be less than construction cost.

A further complication is that cost information about government investments is commonly distorted by monopoly price effects on both sides of the markets in which governments do business. These can drive up prices even where competitive bidding is the norm. Under many federal programs, for example, special contracting provisions

are necessary to allow small firms to bid. In other cases--such as salaries in some occupations--governments tend to pay less than market price, so that investments that involve large service inputs from government agencies (for example, planning and designing road networks, or teaching) may be undercosted. Government powers of eminent domain drive prices down, even for so-called free market purchases. This is particularly important in land-intensive natural resource investments. One writer estimates the social costs (measured as the costs of agricultural production and other benefits forgone) of land that would be flooded by the Narrows irrigation development on the South Platte River in Colorado at three times the amount paid in "open-market" purchases.<sup>1/</sup>

Finally, attempting to value federal investment by trying to measure what the streams of public or government services flowing from the investments are worth is vastly complicated by the pricing of government services. When services are priced too low, for example, users will choose more of them than they would at a price reflecting real costs. This contributes to an appearance of high and sometimes excess demand for public facilities. Yet some federal programs expressly provide subsidies for social purposes through less-than-cost user fees for infrastructure and other facilities. Others provide broadly based benefits that cannot adequately be reflected in user fee revenues. Where fees are low, federal outlays for capital projects meeting these demands are unlikely to reflect their contribution to national net worth.

## MEASURING FEDERAL INVESTMENT SUBSIDIES

Data on federal investment subsidies also suffer from measurement problems. Three common types of investment subsidy are enhanced credit (low-interest loans for housing, for instance), tax concessions (such as those of the early 1980s that permitted accelerated depreciation and provided investment tax credits), and grants (such as those made to states and localities under the federal highway program). The federal government permits state and local governments to offer

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1. Robert A. Young, "Economic Analysis and Federal Irrigation Policy: A Reappraisal," *Western Journal of Agricultural Economics* (December 1978).



tax-exempt bonds, enabling them to borrow at lower cost. Federal credit subsidies are akin to grants, with perhaps only the extent of the federal share of the final investment cost differing. Credit programs enable those who benefit from them to borrow at below-market costs: the amount lent equals the amount to be paid back plus the subsidy provided by federal underwriting. Thus before looking at the investment-inducing effects of subsidies, a "housekeeping" adjustment needs to be made to accounting data on federal lending.

### Accounting for Credit

In ordinary commercial accounting, banks and other financial institutions enter the loans they make as assets, the interest they earn as income, and the capital portion of repayments as reductions in outstanding loan balances. These financial transactions are exactly offset (assuming no inflation) in borrowers' accounts so that the overall economic contribution of financial institutions is in the intermediation between savers and investors: no wealth is created in the offering and acceptance of a loan, but the transaction costs of loan-making are reduced and more investment activity results.

A simple accounting of federal loan assets would treat government loans in the same way--no wealth would be created, and federal loan transactions could be ignored in measuring national capital formation. In its credit programs, however, the government rarely functions as a simple financial intermediary: some programs are ways of conferring subsidies for certain groups or for certain purposes. Others--particularly loan guarantees--serve to reduce information or transaction costs, or to transfer risk, and thus enable borrowers to obtain credit where lenders might not otherwise provide it. In other words, the federal credit intervention conveys a value that substitutes for part of the obligations of borrowers to lenders. When it finances an investment by the borrower, therefore, the federal subsidy is analogous to a grant of the same amount for partly financing the investment cost. <sup>2/</sup>

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2. Quite apart from the share of investments that loan subsidies may finance, however, the accounting for federal credit subsidies as immediate income

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### Importance of Investment Subsidies

Analysts generally conclude that the investment effects of all three types of subsidy--tax incentives, credit subsidies, and grants--are difficult to measure, but small. Because of their effects on the composition of investment, however, the subsidies may have important effects on the national returns to investing. The investment effect of a subsidy would be the net addition to national worth that follows from extending it. The investment effects of tax incentives, say, would ideally be measured as the net investment induced by the concessions above what would otherwise be economically viable, after also deducting any otherwise viable investment deferred by other provisions of the tax code. Similar "with subsidy" and "without subsidy" comparisons would reveal the investment effects of credit subsidies and grants. The federal contribution to capital formation would then be measured by the difference between these two, and recorded at the time of the investment.

Tax Incentives. Analysts generally believe that tax incentives tend to increase net investment, and that tax provisions may have some influence on the composition of capital. But measuring or predicting the effect on investment of any change in tax rules has so far proved inconclusive.<sup>3/</sup> Furthermore, to the extent that incentive effects are real, the higher returns they provide may be reflected in the prices of the investments they favor and thus already included in data on business capital transactions.

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2. Continued

transfers to borrowers significantly alters the measure of net federal saving that is relevant to assessing overall federal contributions to capital formation. This adjustment is now partly made in the NIPA estimates of federal expenditures: loan principal transactions for direct lending are excluded from federal accounts, but the annual interest payments that pass through the budget are included. A better accounting of the resources transfer would capture the value of the federal contribution by estimating the present value of the interest or repayment subsidy conveyed or other values not provided in cash (say, through guarantees) and hence not reflected in either the unified budget or national income treatment of credit programs. These types of adjustment are discussed in detail in Congressional Budget Office, *An Analysis of the President's Budgetary Proposals for Fiscal Year 1988* (February 1987).

3. See, for example, Barry P. Bosworth, "Taxes and the Investment Recovery," *Brookings Papers on Economic Activity* (I:1985).

Credit Programs. For credit programs, likewise, little is known about the size of investment effects. Federal credit tends to alter returns to selected or targeted lending, and may have more effect on the composition rather than the volume of investment. Direct loan subsidies (and tax exemptions for municipal bonds) lower the returns that the investment financed by the loan must pay, if borrowing is to be feasible. They also, however, make lending for such projects as attractive to savers as loans to higher-paying investments. The subsidies thus tend to expand lower-paying investments, and may correspondingly lower national worth compared with the value it would have achieved without competition between subsidized and unsubsidized investment. On the other hand, if measured returns understate the social value of investments, federal subsidies would increase national worth, broadly considered.

Other federal credit programs reduce lenders' exposure and thus induce them to offer more attractive terms to targeted borrowers. Several motives underlie these programs. Where lenders incur high information costs in assessing default risks for a large number of potential borrowers of small amounts, they may tend to set high premiums on all loans, or even to refuse to lend regardless of risk. For example, banks and their depositors may resist making loans to students who could easily leave the area without repaying or could not offer collateral even if they remained. Federal guarantees against nonrepayment would tend to expand investment financing for high-paying investment by creating markets where high information costs or poor risk-management opportunities limit commercial activity, and thus could raise the value of national investment above that which would otherwise be undertaken, by increasing the range of feasible choices. Thus guarantees that absorb some information and risk premiums may add to returns on national capital in the same way as cash subsidies for the same investments. The federal share of private investment financed with guaranteed credit is appropriately measured by the (estimated) cost of the private insurance that would just induce the lenders to offer the same terms to borrowers.<sup>4/</sup>

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4. For a discussion of the issues in measuring resource transfers under federal credit programs, see Congressional Budget Office, *An Analysis of the President's Budgetary Proposals for Fiscal Year 1988* (February 1987), Chapter VI.

Grants. The third type of investment subsidy--grants to individuals and to state and local governments--is similar to credit assistance in that grants lower the local cost of investment. But the assets constructed or purchased are owned and maintained by states and localities, and outlays for grants count as federal investment only if the subsidies they provide result in additional capital formation. Here, as with other incentives, the evidence is mixed, but generally does not suggest a large boost to investment. Students of public finance have for more than a decade found that federal capital grants to states and localities increase their capital spending by less than the face value of the grants. Recent studies have generally concluded that the ratio is no more than around 30 percent to 40 percent.<sup>5/</sup> This means that an extra dollar in federal grants will increase national investment not by a dollar but by only about 30 to 40 cents. The remainder represents an income gain to states and localities.

Subsidies in the form of transfers to individuals and households also appear to add little to overall investment totals. Studies of the extent to which student loan assistance, for example, induces more high school graduates to enroll in college show mixed results. Interpreting these results is also complicated--first, because they are usually based on data from high school graduates who have already applied for college entrance, and second, because they rarely distinguish the source of aid. Taken together, the studies of education aid suggest that decisions to attend college are largely determined by family and personal considerations and that the influence of financial assistance is at best small; one representative study estimates, for example, that universal aid (at the average level for assisted students) would raise college enrollments from 46 percent of high school graduates to only between 49 percent and 56 percent.<sup>6/</sup> Most federal training assistance is also provided through states and localities, but its impact on levels of national training and retraining in work force skills is unclear.

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5. The impact of federal grants to states and localities on nonfederal spending for physical facilities is discussed in more detail in Congressional Budget Office, *Federal Policies for Infrastructure Management* (June 1986).
  6. Gregory A. Jackson, "Financial Aid and Student Enrollment," *Journal of Higher Education*, vol 49, no 6 (1978).